

**INTERNATIONAL ORGANISATION FOR STANDARDISATION
ORGANISATION INTERNATIONALE DE NORMALISATION
ISO/IEC JTC1/SC29/WG11
CODING OF MOVING PICTURES AND AUDIO**

**ISO/IEC JTC1/SC29/WG11 MPEG2016/M38644
May 2016, Geneva (CH)**

Source **Telecom ParisTech, Canon Research Centre France**
Status **For consideration at the 106th MPEG meeting**
Title **Describing Tile Regions in ISOBMFF**
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1 Introduction

As written in LHEVC File Format DIS text, action was taken to move the trif sample group description to a part 12 in order to be able to identify tiles of a video in a single file (cf contribution m33222).

There is ongoing discussion whether trif/tsif should be merged in a single group description; this contribution is an attempt at defining the tile sample group depending on the outcome of this discussion.

2 TileRegionGroupEntry

Note that for the sake of clarity, the full_picture flag has been moved to first field rather than second as is currently the case in the study of FDIS.

2.1.1 Definition

Group Types: 'trif'
Container: Sample Group Description Box ('sgpd')
Mandatory: No
Quantity: Zero or more

2.1.2 Syntax

```
class TileRegionGroupEntry() extends VisualSampleGroupEntry ('trif')
{
    unsigned int(1)  full_picture;
    unsigned int(7)  template=0;
    unsigned int(16) groupID;
    if (!full_picture) {
        unsigned int(16) horizontal_offset;
        unsigned int(16) vertical_offset;
    }
    unsigned int(16) region_width;
    unsigned int(16) region_height;
}
```

2.1.3 Semantics

template reserved for this specification but can be overridden by derived specification.

`groupID` is a unique identifier for all tile region sample group descriptions that relate to the same visual region. Value 0 is reserved for special use by derived specifications. Derived specification may override the semantics of this field.

`full_picture`, when set, indicates that this rectangular tile region is actually a complete picture, in which case `region_width` and `region_height` shall be set to the width and height of the reference region. Semantics for this field may be further restricted by derived specifications.

`horizontal_offset` and `vertical_offset` give respectively the horizontal and vertical offsets of the top-left pixel of the rectangular region represented by the rectangular tile region, relative to the top-left pixel of the reference region. For the context of this specification, the reference region is the region formed by the union of all sample group description of type 'trif' with the same `groupID`. Semantics for this field may be further restricted by derived specifications.

`region_width` and `region_height` give respectively the width and height of the rectangular region represented by the rectangular tile region, in luma samples.

3 TileRegionEntry

Group Types: 'tile'
Container: Sample Group Description Box ('sgpd')
Mandatory: No
Quantity: Zero or more

The TileRegion sample group description is used to describe the spatial relationship between video or image media tracks. It allows identifying that decoded samples of a track spatially correspond to a given rectangular area in another track.

3.1.1 Syntax

```
class TileRegionEntry() extends VisualSampleGroupEntry ('tile')
{
    unsigned int(16) region_id;
    unsigned int(16) horizontal_offset;
    unsigned int(16) vertical_offset;
    unsigned int(16) region_width;
    unsigned int(16) region_height;
}
```

3.1.2 Semantics

`region_id` is a unique identifier for all tile region sample group descriptions that relate to the same visual region.

`horizontal_offset` and `vertical_offset` give respectively the horizontal and vertical offsets of the top-left coordinate of the rectangular region represented by the rectangular tile region, relative to the top-left coordinate of the reference region. The reference region is the region formed by the union of all sample group description of type 'tile' with the same `region_id`.

`region_width` and `region_height` give respectively the width and height of the rectangular region represented by the rectangular tile region, in integer coordinates.

Note: Units used to describe the region size are arbitrary units and may correspond to video pixel resolution, but don't have to.

4 TileTrackReference

We suggest the following new track reference:

“A video track A may use a track reference of type “tile” to a video track B in order to indicate that the content of A is a rectangular region of the content of B. The description of the location of this area is given by TileGroupEntry sample group descriptions.”

5 Conclusion

We suggest adopting the tile region description in 14496-12 as identified in 14496-15 FDIS; depending on the result of the discussions in LHEVC file format, a complete redefinition of the sample group may however be needed, as specified in Section 3.